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China's Science and Technology Reforms [redacted] 25X1

Summary

The Central Committee's Decision on S&T reforms of 13 March gives the highest official endorsement to modernizing China's S&T structure. The reforms--which rely heavily on economic incentives and market mechanisms--are aimed at overcoming chronic management problems that have hobbled the Chinese S&T system and increasing its contribution to national development. China's determination to reform its S&T system is also reflected in the appointment of technocrat Song Jian as Minister-in-Charge of the State Science and Technology Commission and in proposed plans for the reorganization of the Chinese Academy of Science. The reforms could radically change the Chinese S&T structure, but we believe implementation will be slow. [redacted] 25X1

The Decision reaffirms China's opening to the West in science and technology and some of the reforms are based on US experience in managing S&T. As China focuses its domestic resources on applied research and development work, we believe it will push for greater technical cooperation with the United States as opposed to cooperation in basic

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This memorandum was prepared by [redacted] of the Office of East Asian Analysis in response to a request from the Office of Cooperative Science and Technology Programs, Department of State. Questions and comments are welcome and may be addressed to Chief, China Division, at [redacted] 25X1 25X1

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research. Nevertheless, the proliferation of players and the potential loosening of central oversight implied by the reforms may complicate the course of US-PRC S&T cooperation.

Introduction

Since 1981, Beijing has tried to increase the contribution of S&T to national development by emphasizing applied rather than basic research and by working to overcome S&T management shortcomings. The Chinese research and development structure has long been hampered by:

-- Lack of coordination between research institutes,

-- Inefficient use of resources; overemphasis on theoretical research,

-- Inability to apply research results to production,

-- Lack of incentives for quality performance; interference by party cadre, and technically unqualified managers,

-- Lingering suspicion of intellectuals.

In 1982 and 1983, Beijing instituted several organization reforms. The State Science and Technology Commission (SSTC), which had been the leading body for planning and coordination of S&T activities, was forced to share its planning functions with the State Economic Commission and the State Planning Commission. China also established a Leading Group for Science and Technology directly responsible to the State Council and chaired by Premier Zhao Ziyang. A second Leading Group was set up to oversee the key electronics industry. Under these groups, China began to experiment with new mechanisms for managing S&T and increasing the contribution of S&T to the economy. (See Appendix for Chinese S&T Organizations.)

Party Decision on S&T Reform

China's leadership underlined its support for S&T reforms in early March when nearly the entire Politburo attended the National Scientific and Technological Work Conference. A host of party and government leaders spoke about the importance of reforms, including Deng Xiaoping, Party Chairman Hu Yaobang, Premier Zhao Ziyang, Minister-in-Charge of the State Planning Commission Song Ping, State Councillor Fang Yi and Song Jian.

The Central Committee's 13 March "Decision on the Reform of the Science and Technology Management System" gives the party's political affirmation to structural changes that S&T reformers have been advocating for several years. Although embassy

officials report that the decision was drafted primarily within the SSTC rather than in party organization, the party's stamp of approval is necessary for such a major reform effort. Party approval is particularly important since some of the opposition to S&T reforms in the past has come from party members.

The document calls for using economic levers and market regulation in science and technology management. Deng linked S&T reforms to the sweeping economic reforms--announced last fall--in his speech to the conference, calling on the S&T community to put the two reforms together to solve the longstanding question of the "disconnection" between S&T and the economy.

The decision--like the reforms of the economic system--represents an exhaustive wish list for changes in S&T management. It calls for reforming the funding system, greater exploitation of technology, less state control, and greater use of economic levers to control S&T work and encourage initiative. Specific reforms include:

-- Funding. State funding will gradually be reduced for institutes involved in development and applied research. These institutes are to become self-reliant within three to five years through reliance on contracts for research projects, consulting services, technology transfer, and joint venture arrangements with enterprises. A system of science funds will be introduced to support basic and some applied research projects with state funds. Institutes involved in research on selected topics such as public health and disaster prevention will continue to receive state appropriations.

-- Greater Management Autonomy. Research institutes will be granted more decisionmaking power in matters such as planning, outlays, personnel management, rewards, and internal structure. Directors of institutes, who will still be appointed by higher authorities, will take full responsibility for their decisions. Project team leaders will be given increased authority, and project teams may be made up of personnel hired by the team leader or through free association. Collectives and individuals are now permitted to set up scientific or technical service organizations for profit.

-- Personnel Management. The document calls for training more S&T personnel and administrators, giving talented persons positions of responsibility, improving working and living conditions for S&T personnel, promoting a rational flow of S&T personnel, allowing research institutes and schools

to adopt a hiring system. S&T personnel are to be permitted to take up appropriate side jobs, and free discussion in academics is to be guaranteed. 25X1

-- Exploitation of Technology. The document recognizes technology as a commodity and calls for: changing the practice of uncompensated transfer of technological achievements; actively promoting technology transfers through technology markets and other services; enacting laws to protect rights of buyers and sellers of technology; and determining market prices of technology through negotiation without state restrictions. Institutes are encouraged to set up partnerships with production enterprises. Defense research institutes are also to establish a system to increase their contribution to economic development. 25X1

Changes in SSTC Leadership

The party decision is only the latest in a series of moves by Beijing to promote S&T reform. Last summer Fang Yi was removed from his position as Minister-in-Charge of the SSTC, a change we believe reflects Beijing's dissatisfaction with his management of the SSTC and frustration at continuing problems in S&T management. In addition, Fang had been closely identified with basic research projects in the past, and may have been seen as not vigorously implementing the policy of favoring applied research. Fang, however, retains his position as one of two deputy heads of the S&T Leading Group and remains the preeminent spokesman for S&T. 25X1

Song Jian, Fang Yi's replacement, is experienced in managing large-scale technology projects and has a vigorous management style. Song was formerly a vice minister of the Ministry of Astronautics with responsibility for China's satellite programs. He is much more active in the daily operations of the SSTC than Fang Yi was. Song reportedly has been a major player in the current process of formulating S&T reforms through his position at the SSTC and in his capacity as director of the office of the S&T Leading Group. Song may be trying to reestablish the SSTC's former role as the leading S&T policy organization. 25X1

Four new vice ministers for the SSTC have been appointed under Song Jian, strengthening the SSTC's ties to important segments of the R&D community. One of the appointees is being promoted from within the SSTC, another from the Ministry of Machine Building, a third from Qinghua University, and the fourth is deputy director of the office of the S&T Leading Group as well as being active in high energy physics programs. The

appointments, which run counter to the trend of reducing vice ministers throughout China's bureaucracy, suggest Song is moving aggressively to surround himself with the personnel needed to carry out reforms. 25X1

Proposed CAS Reforms

Lu Jiaxi, President of the Chinese Academy of Sciences (CAS) and other CAS spokesmen have already announced plans to change funding mechanisms, permit greater mobility for S&T personnel, and increase the autonomy of individual institutes. Most striking is Lu's stated goal of divesting CAS of from one- to two-thirds of its 118 institutes in order to decentralize control over S&T and promote closer links between research and production enterprises. The institutes may be placed under local control, combined with other institutes, turned over to other ministries, or disbanded. The party Decision notes the need for CAS institutes involved in technology development to set up partnerships with enterprises and the importance of CAS basic research institutes. 25X1

Prospects for Change

Several factors bode well for the reform of China's S&T system. Beijing apparently is united behind the reforms, with both party and government authorities lined up in support. Song Jian has been actively working on the reforms and assembling an effective management team. The top leaders within CAS are advocating the reforms, and most of the CAS research directors have been replaced in recent years with younger, presumably more progressive, individuals who should favor the reforms. 25X1

In addition, a large number of institutes and enterprises throughout China have already acquired favorable experience with the reforms. All of the reforms outlined in the party document have been advocated by China's S&T leadership for some time, several in formal documents approved by the State Council. Many have been implemented on at least a trial basis for the past several years. Provinces have adopted measures increasing personnel mobility and experimenting with alternative funding mechanisms. Reports of contracts or successful technology transfers between research institutes and production enterprises are common. 25X1

Nonetheless, potential problems remain. Critics of the S&T reforms (similar to critics of the economic reforms) include those who are threatened by the call for younger, better educated personnel as well as those who object to the new market-oriented reforms on ideological grounds. Deng and other leaders appear to have addressed these latter critics by stressing that the reforms are part of building a socialist society with Chinese characteristics. In his speech to the national science conference Deng also alluded to denigration of intellectuals as a continuing problem. The party document calls on party cadre

within S&T organizations, who have resisted changes in the past, to provide support for the implementation of the reforms and to be enthusiastic in supporting science.

Decentralization of CAS may be difficult if personnel associated with institutes slated for divestiture resist leaving the prestigious umbrella of CAS for association with an industrial ministry. For similar reasons, S&T personnel are much more likely to want to transfer to institutes in urban locations than to the interior where qualified personnel are needed. Bureaucratic obstacles such as the need for housing permits may also limit greater personnel mobility.

Resistance to the policy of favoring applied over basic research is also likely in certain quarters, both from reluctance on the part of basic researchers to switch research fields as well as from a genuine concern over the possible long-term effects of neglecting basic science. The party Decision offered some reassurance to these critics by calling for steady, continuous progress in basic research.

The reforms have the potential to change radically the nature of the Chinese S&T system, but progress is likely to be slow. The party Decision stresses that any reform must be gradually popularized and concludes by cautioning that "we should not expect to achieve quick results."

Implications for US-PRC S&T Relations

The party Decision reaffirmed the principles of opening to the West in S&T and of importing technology. Chinese S&T leaders have modeled some of their reforms on S&T structures in the United States and are actively seeking US advice on S&T management.

Although decentralization may increase opportunities for cooperation by allowing ministries more autonomy in developing international cooperative relationships, any lessening of central oversight of international S&T relationships could lead to greater confusion in managing US-PRC protocols. Whether this turns out to be the case depends largely on the role the SSTC is willing to play. The SSTC recently has expressed more interest in policy than in program coordination, but the importance of the US-PRC S&T relationship to China is such that the SSTC is unlikely to completely relinquish its program oversight role.

The Chinese push for greater cooperation between institutes working on related topics may in time make it easier for several organizations to be involved in a particular protocol. Bureaucratic rivalry has caused problems in the past, however, and will not disappear overnight. In addition, in keeping with

China's current focus on applied research and use of technology, China may push for greater technical cooperation rather than cooperation in basic research. The Chinese may also look for more participation by private companies in future protocols, as they have for the telecommunications protocol.

APPENDIX

Major Chinese S&T Organizations

Figure 1 shows the major S&T policy organizations in China today, including the layer of leading groups added in 1982. In addition to those listed in the figure, members of the S&T Leading Group include the Minister of Education, the Chairman of the State Economic Commission, a Vice President of CAS, the Minister of Labor and Personnel, the Chairman of the National Defense, Science, Technology, and Industry Commission (NDSTIC), and Song Jian. The diagram does not fully indicate the prominent part the party plays throughout the S&T establishment.

China has been working toward an integration of its military and civilian S&T structures, as illustrated in Figure 2. We believe the appointment of Song Jian, formerly with the Ministry of Astronautics, a defense industry, is intended to further the merger of military and civilian organizations.

The S&T reforms primarily will affect the relationship between the policy organizations and the research elements (shown at the bottom of Figure 1). General guidelines for S&T priorities will continue to come from central policy organizations, but research elements will have much more freedom to choose projects and personnel if the reforms are implemented. Research institutes involved in basic research (which should be a reduced number) will remain tied to the central government for funding, but institutes involved in applied and development work will be increasingly independent of the central government as they get more of their funding through contracts with production enterprises. Contacts between research institutes, even those subordinate to different ministries, should increase. If the proposed CAS reorganization takes place, CAS will become a smaller organization more focused--if not exclusively focused--on basic research.

FIGURE 1

China's Research and Development Community

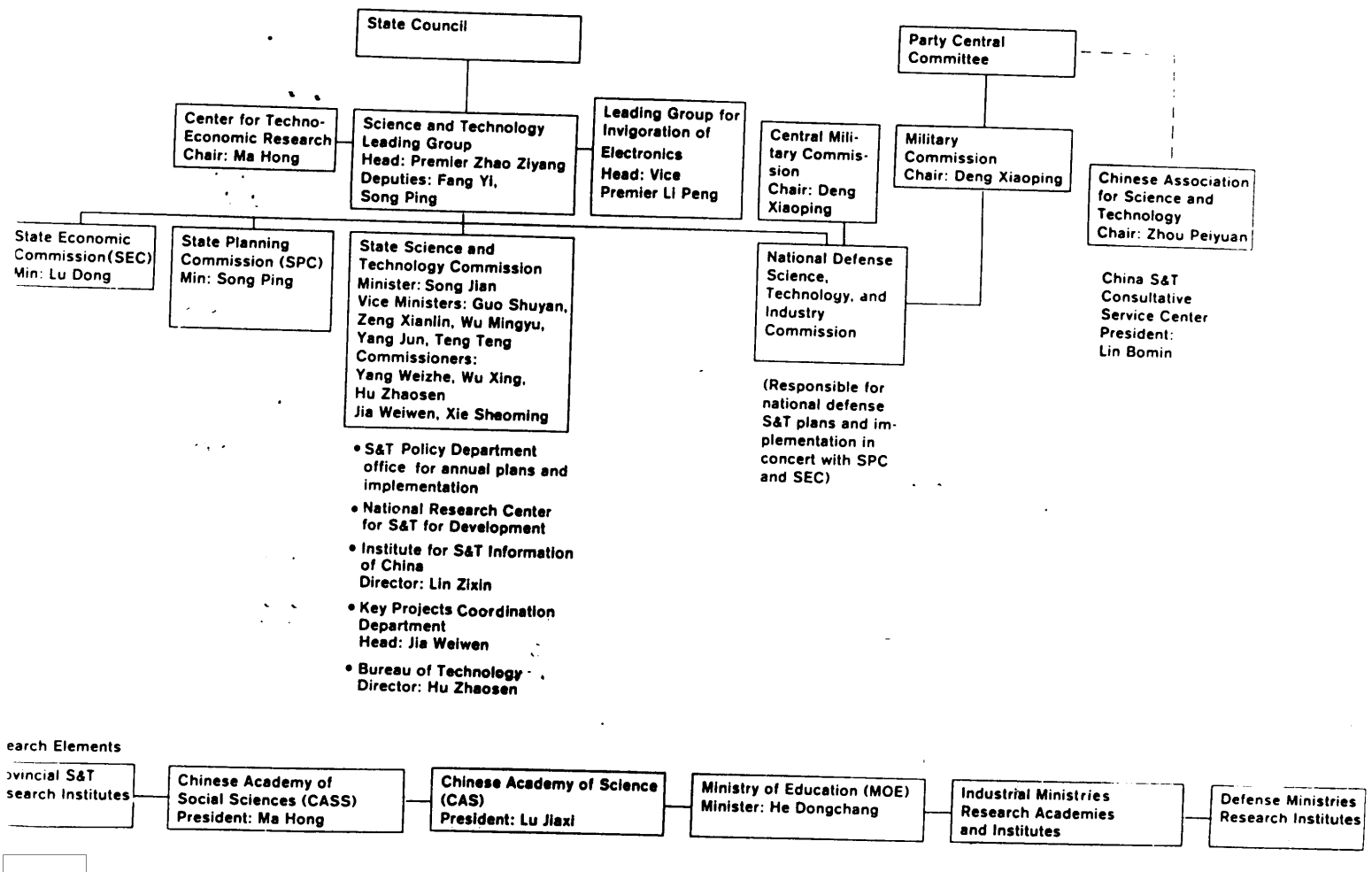

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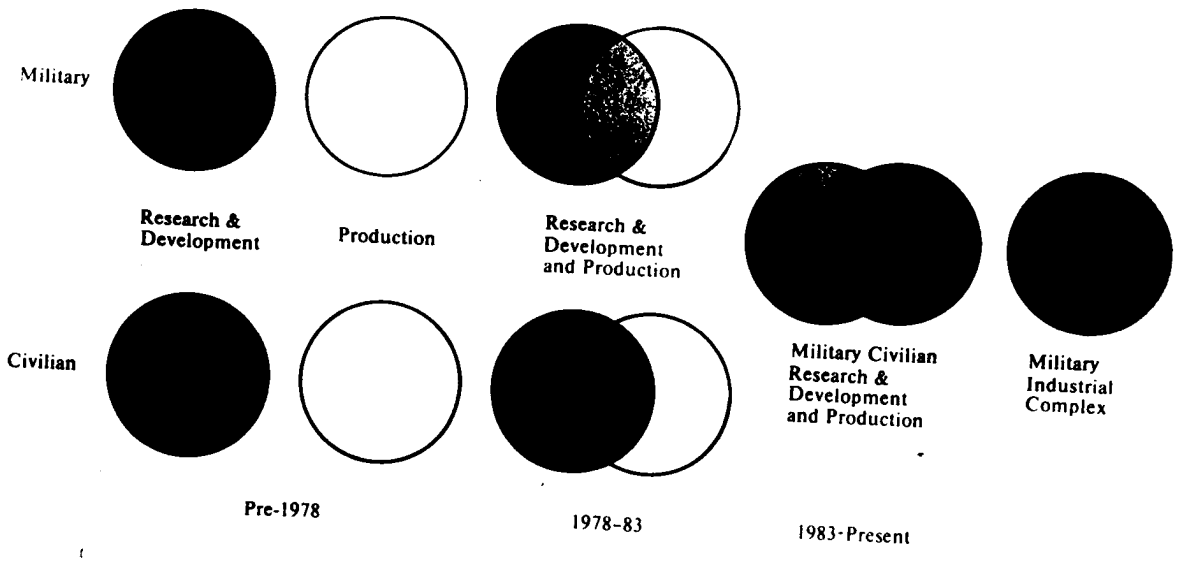
FIGURE 2

China: Evolution of the Military-Industrial/Scientific Complex



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